

Matthew Ford

GW Model

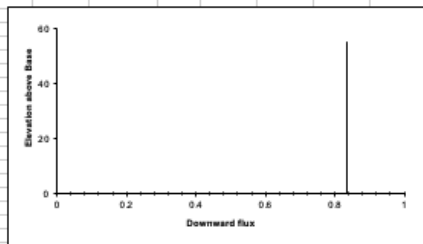
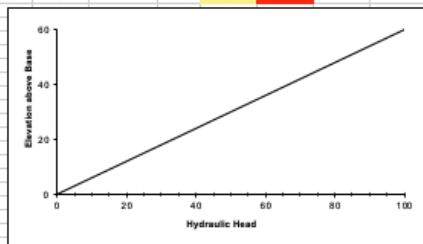
Assignment 1

Correct Figures

Direct solution for flux		
	K	num cells
zone 1	0.5	12
zone 2	0.01	0
zone 3	0.0001	0
Keq	0.5	
q	0.833333	

z	K zone cell	K cell	H	q	zone 1	zone 2	zone 3
60	1	0.5	100	0.833333	1	0	0
55	1	0.5	91.66667	0.833333	1	0	0
50	1	0.5	83.33333	0.833333	1	0	0
45	1	0.5	75	0.833333	1	0	0
40	1	0.5	66.66667	0.833333	1	0	0
35	1	0.5	58.33333	0.833333	1	0	0
30	1	0.5	50	0.833333	1	0	0
25	1	0.5	41.66667	0.833333	1	0	0
20	1	0.5	33.33333	0.833333	1	0	0
15	1	0.5	25	0.833333	1	0	0
10	1	0.5	16.66667	0.833333	1	0	0
5	1	0.5	8.333333	0.833333	1	0	0
0	1	0.5	0	0.833333	1	0	0

Map of node and cell numbers		
node	cell	
1	-	1
2	-	2
3	-	3
4	-	4
5	-	5
6	-	6
7	-	7
8	-	8
9	-	9
10	-	10
11	-	11
12	-	12
13	-	13



The Challenge:

Create a 1D, vertical steady state model with constant head top and bottom boundaries.

Show, based on the flux with depth, that the model is steady state.

Repeat this for a homogeneous and for a heterogeneous column.

Show that the steady state flux agrees with the direct calculation based on the harmonic mean average K.

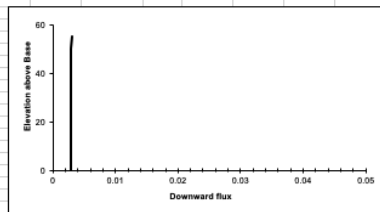
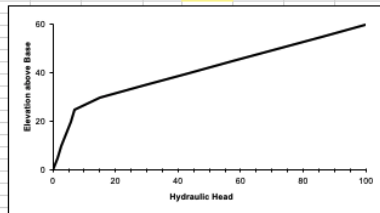
Show the steady state head profile for a column with approximately equal-thickness layers with different K values.

Use this profile to explain why the equivalent hydraulic conductivity, Keq, is closer to the lower of the K values.

	K	num cells
zone 1	0.001	6.5
zone 2	0.01	5.5
zone 3	0.0001	0
Keq	0.00170213	
q	0.00283698	

z	K zone cell	K cell	H	q	zone 1	zone 2	zone 3
60	1	0.001	100	0.0028374	1	0	0
55	1	0.001	85.813188	0.0028374	1	0	0
50	1	0.001	71.626925	0.0028373	1	0	0
45	1	0.001	57.441332	0.0028371	1	0	0
40	1	0.001	43.256429	0.002837	1	0	0
35	1	0.001	29.072153	0.0028369	1	0	0
30	1	0.001	14.888392	0.0028368	1	0	0
25	2	0.01	7.087736	0.0028366	0	1	0
20	2	0.01	5.6697985	0.0028359	0	1	0
15	2	0.01	4.2521504	0.0028353	0	1	0
10	2	0.01	2.8347008	0.0028349	0	1	0
5	2	0.01	1.4173504	0.0028347	0	1	0
0	2	0.01	0	0.0028347	0	1	0

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node	cell	
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4	-	4
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